RTCA Special Committee 186, Working Group 3

ADS-B 1090 MOPS, Revision A

Meeting # 13

20-22 August 2002

**Changes required for DO-260A because of
MASPS Issue Papers addressed in DO-242A
That Have Not Been Previously Addressed**

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SUMMARY
This Working Paper is an examination of the 31 Issue Papers addressed in Revision A of the ADS-B MASPS (DO-242A), and what corresponding changes are needed in revision A of the 1090 MHz ES MOPS.   Working Papers and draft MOPS sections introduced at previous WG3 meetings are cited for those Issue Papers whose topics and MASPS changes are already being worked on by WG3 members. For those Issue Papers that still need to be addressed by WG3, specific changes to DO-260A are proposed, or sections are listed in which changes and/or additions will be needed. Other Issue Papers are identified to which no changes in the 1090 MHz MOPS are believed to be required.

IP#	Description	MASPS Section	WG3	
01	Turn indication is problematic and should be deleted as a required ADS-B message element.	2.1.2.2, 2.1.2.2.3, Tables 2-2, Table 2-4a, 3.2.1.1, Table 3-5, 4.0	RJ SS	1090-WP-12-02 {2.2.8.1, deleted 2.2.8.1.19} Needed Actions: • Delete item XV "Turn Indication" from Note 2 for Tables 2-3 & 2-4 • Remove "Turn Indicator" subfield {§2.2.3.2.6.1.13, §2.2.3.2.6.2.13, §2.2.3.2.6.3.13, §2.2.3.2.6.4.13} from ADS-B Airborne Velocity Message – Subtypes "1" through "4" {§2.2.3.2.6.1, §2.2.3.2.6.2, §2.2.3.2.6.3, §2.2.3.2.6.4} • Remove items "c" and "e" of §2.2.5.1.10 Ground Track Data • Remove § 2.2.5.1.15 & §2.4.5.1.15 "Turn Rate Data." (Turn Rate Data appears to only be used to set the Turn Indicator information. • Remove item 9 of all four Airborne Velocity Subtype "X" Message Latency sections {§2.2.5.3.4 - §2.2.5.3.7} **AND** step 13 of corresponding verification sections {§2.4.5.3.4 & §2.4.5.3.6} • Remove Verification of "Turn Indicator" subfield sections in all corresponding §2.4 sections for those Airborne Velocity Message subtypes listed above {§2.4.3.2.6.1.13, §2.4.3.2.6.2.13, §2.4.3.2.6.3.13, and §2.4.3.2.6.4.13} • Remove 2.4.2.8.1.19, Verification of Turn Indication Reporting • Redo Table 2-116 for new SV definition • Redo Figure A-6 for new ADS-B Airborne Velocity Message – Subtypes "1&2" • Redo Figure A-7 for new ADS-B Airborne Velocity Message – Subtypes "3&4" • Remove Turn Indicator row from Tables H-1 & H-2
02	Altitude rate is problematic and should be deleted as a required ADS-B message element. (*This Issue Paper was closed, but the final resolution was to only require altitude rate from **one source, not both**, when available. Altitude rate is still a required SV report element.*)	2.1.2.8 3.4.3.16	RJ	1090-WP-12-02 {2.2.8.2.18}

IP#	Description	MASPS Section	WG3	
04	Request that ownship's make and model or aircraft size characteristic be broadcast.	2.1.2.3, 3.4.4.6 Appendix P	RJ, JM	1090-WP-12-02 {2.2.8.2.8}, 1090-WP-12-13 {2.2.3.2.7.3.11}
05	Requirements needed to provide anonymity protection for GA aircraft.	2.1.2.2.2.2	RJ	1090-WP-12-02 {2.2.8.1.3, 2.2.8.2.3}
06	Broadcasting of information from moving and stationary obstacles in and around airports.	2.1.2.2.3 3.4.4.5	RJ	1090-WP-12-02 {2.2.8.2.7}
08	Current NUC definition is insufficient. Accuracy and integrity need to be separate components.	2.1.2.12 – 2.1.2.15, 3.4.3.18, 3.4.4.11 – 3.4.4.13	RJ, JM	1090-WP-12-01 {2.2.3.2.7.1.3.11, 2.2.3.2.7.1.3.13}, 1090-WP-12-02 { 2.2.8.1.16, 2.2.8.12, 2.2.8.13, 2.2.8.14}, 1090-WP-12-13 {2.2.3.2.7.3.6, 2.2.3.2.7.3.7, 2.2.3.2.7.3.9}
12	Request that an aircraft's CDTI and TCAS/ACAS capabilities and TCAS/ACAS RA information be broadcast as part of the ADS-B message Mode Status reports.	2.1.2.10, 2.1.2.11, 3.4.4.9, 3.4.4.10	JM	1090-WP-12-13 {2.2.3.2.7.3.3.2, 2.2.3.7.3.3.3, 2.2.3.2.7.3.4.2}
14	Use of a "certified navigation center" with own position.	2.1.2.5,	RJ, JM	1090-WP-12-02 {2.2.8.2.8}, 1090-WP-12-13 {2.2.3.2.7.3.3.7, 2.2.3.2.7.3.11}
18	Request to broadcast own aircraft's heading at Vstop.	2.1.2.9, 3.4.3.12, 3.4.3.13	RJ, JM	1090-WP-12-02 {2.2.8.1.11}, 1090-WP-12-13 {2.2.3.2.4.3, 2.2.3.2.4.4}
22	Means to ensure backwards compatibility with deployed ADS-B systems.	3.4.4.3	RJ, JM	1090-WP-12-02 {2.2.8.2.5}, 1090-WP-12-13 {2.2.3.2.7.3.5}
26	Format for incorporating Short- and Long-Term Intent Information.	2.1.2.19, 3.3.3.1.4, 3.4.8, 3.4.9	RJ	1090-WP-12-01 {2.1.11, 2.2.3.2.7}, 1090-WP-12-02 { 2.2.8.1.1.1, 2.2.8.3.1}
32	Revise capability code definition	2.1.2.10 3.4.4.9	RJ, JM	1090-WP-12-01 {2.2.3.2.7.1.3.14}, 1090-WP-12-02 {2.2.8.2.10}, 1090-WP-12-13 {2.2.3.2.7.3.3}
33	Re-organize the SV and MS report elements	3.4.3, 3.4.4	RJ, JM	1090-WP-12-02: SV: {2.2.8.1, 2.2.8.1.1.1} MS: {2.2.8.2, 2.2.8.2} 1090-WP-12-13

IP#	Description	MASPS Section	WG3	
35	Delete or change note 7 of Table 3-4 to assure that this note does not change or supercede the requirements defined in Table 3-4.	Table 3-4a	None	**No WG3 action necessary.** *The final resolution to this Issue Paper was the elimination of the old note 7 and the insertion of a new note 12 for Table3-4(a). (See row for Issue Paper 38.) The original note 7 was used as an alternative way to interpret the requirements of DO-242 Table 3-4, however, this alternative was not used by the original authors of DO-260.*
36	Simultaneous Parallel Approach Ranges	Tables 2-4a & 3-1	SS	Table 2-1 from DO-260 is a copy of the MASPS Table 3-1. Comments cell of C2 row needs to be changed in accordance to MASPS change by replacing "Approach coverage out to 10 nmi." with "Expected approach coverage out to 30 NM, or the point where the aircraft intercepts the final approach course."
37	Air Reference Velocity Vector (IPs 9, 27, 28, and 3X)	3.4.7 Appendix Q	RJ	1090-WP-12-02 {2.2.8.1.1.1, 2.2.8.3.2}
38	Determination of Airborne and On-Ground States	3.4.3.1	JM	TBD
39	Does the vertical height integrity (NIC) value need to be the same as the horizontal integrity level so suitably equipped aircraft can perform ACM functions against ADS-B equipped TARGET aircraft?	2.1.2.16, 2.1.2.17, 3.4.4.14, 3.4.4.15	RJ, JM	1090-WP-12-01 {2.2.3.2.7.1.3.12}, 1090-WP-12-02 {2.2.8.2.15, 2.2.8.2.16}, 1090-WP-12-13 {2.2.3.2.7.3.8, 2.2.3.2.7.3.10}
41	Emergency Locator Transmitters Functionality for General Aviation	3.4.4.7	SS	For Emergency/Priority Status Coding in Figure A-9 in Appendix A, change the meaning for a value of 6 from "Reserved" to "Downed Aircraft".
46	Revise Table 3-3 and 3-4 to better reflect range dependency of requirements rather than application dependency.	3.2.3.1, Table 3-1, Table 3-3(a), Table 3-3(b), Table 3-4	None	**No WG3 action necessary.** *The intent of this Issue Paper was to rework the tables to clarify that the requirements were dependant on the operational ranges and not on the example applications. These changes should not have impacted any of the acquisition range or update rate requirements specified in DO-260.*
47	Add approach spacing intent information as an additional example in Appendix M.	Appendix M M.3	None	**No WG3 action necessary.** *The inclusion of the additional example in Appendix M does not impact any minimum requirements for the 1090MHz ES system.*

IP#	Description	MASPS Section	WG3	
52	IDENT transponder-like feature	2.1.2.11, 3.4.4.10.2	JM	1090-WP-12-13 {2.2.3.2.7.3.4.3}
53	Ability to identify a/c not flying under ATC control (squawk 1200)	2.1.2.11, 3.4.4.10.3	JM	1090-WP-12-13 {2.2.3.2.7.3.4.4}
54	Ability to inhibit broadcast of invalid altitude data	2.1.2.6	??	A subsection to §4.4 "Controls" will need to be added that specifies non-transponder devices must have a control that enables the pilot to inhibit the broadcast of altitude if it is determined by the cockpit or ATC to be invalid. (*No action is needed for transponder based systems. This requirement is already part of the Mode S transponder MOPS as this Issue Paper is based on requests for transponder-like functionality for all ADS-B equipment.*)
55	User Population Requirements	3.3.3.1.1 3.3.3.1.2 3.3.3.1.3 3.3.3.1.4	None	**No WG3 action necessary.** (Exception would be new appendix on 1090MHz ES performance for intent information.) *The final resolution for this Issue Paper was the insertion of language that specified that the 95% acquisition range requirements for all ADS-B reports are to be interpreted that 95% of the observable population be acquired – not that there is a 95% probability for any one target to be acquired.*
56	Delete "Surveillance Support Code" from Mode Status Report	3.4.4	JM	
58	Conditional relaxation of 3 second update rate at close ranges	Table 3-4(a) Note 12	None	**No WG3 action necessary.** *Note 12 discusses the allowed relaxation of the 3-second update rate to 5 seconds for some aircraft pairs not within 10 NM and the geometric constraints defined in the note. Since DO-260A will <u>NOT</u> have a dynamic SV update rate for airborne aircraft, nor will DO-260A try to evaluate these requirements in a different manner at proximate ranges this note is not an issue for WG3 at this time.*

IP#	Description	MASPS Section	WG3	
59	Consistent use of "NM" for abbreviation of nautical miles	Entire Document	GF	Global replacements of all instances of "nmi" and "nm" will be done by Gary Furr, master editor extraordinaire.
60	Acquisition Range Requirements for Orthogonal Encounter Scenarios	Table 3-4(a) Note 3	None	**No WG3 action necessary.** *DO-260 does not address acquisition range requirements for aft, port, or starboard directions, nor does it provide any analysis in these areas. DO-260 only addresses requirements for head-on encounters. Unless WG3 feels the need to include such material, the changing of this note does not impact work on DO-260A.*
62	Delete note regarding transponder codes in A/V Address requirements.	2.1.2.2.2 (Note 3)	None	**No WG3 action necessary.** *Note 3 has been changed from the original note (Note 2 for §2.1.2.1.2 "Address" from DO-242). These changes were largely nuancing the note to satisfy UAT and GA concerns that the MASPS was written from too much of a transponder-based system's point of view.*
64	Creation of new Status Change On-Condition report.	3.4.6	None	**No WG3 action necessary.** *In response to comments submitted on draft MASPS, the Status Change report was removed from DO-242A. There is text discussing "messages supporting MS or SC reports" being updated at rates similar to those of SV, but no specifics are provided in DO-242A.*